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GB 2339505 A GB 2330982 A EP 0962852 A2  
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INT CL<sup>7</sup> H01M 2/00 2/06 2/10 , H04M 1/00 1/02 1/03  
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(54) Abstract Title  
**Communication device with cursor control on reverse side to display**

(57) A radiotelephone (100) having a removable battery (220) with an in-built icon positioning device (230) for controlling the position of a cursor (130) on a display (120) on the opposite face (110) of the radiotelephone (100). First and second keys (144, 146) or switches (150, 160) on the radiotelephone (100) may be used to control operation of the icon positioning device (230).

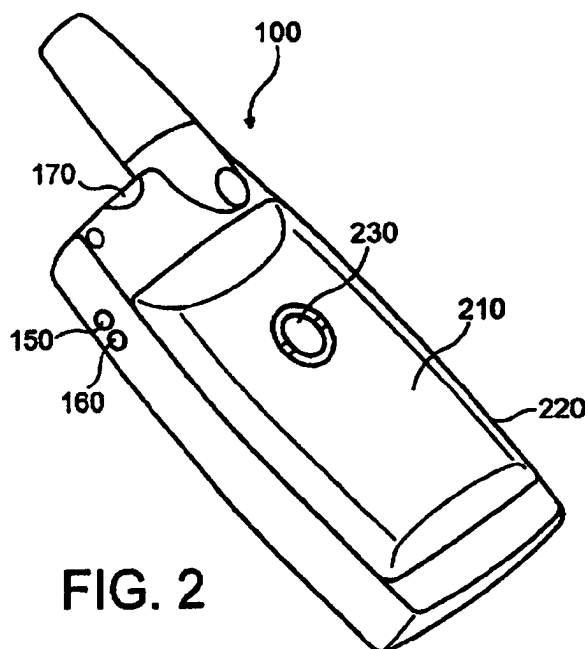


FIG. 2

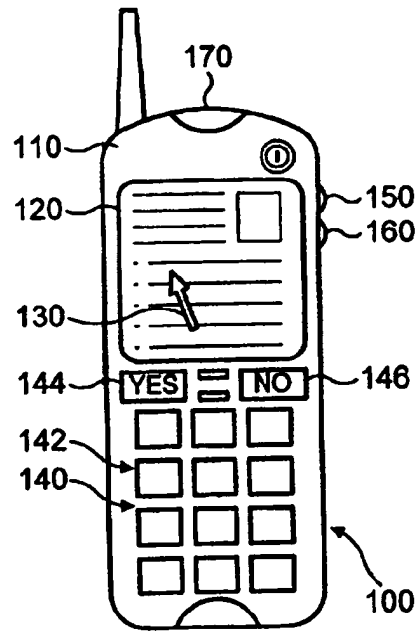


FIG. 1

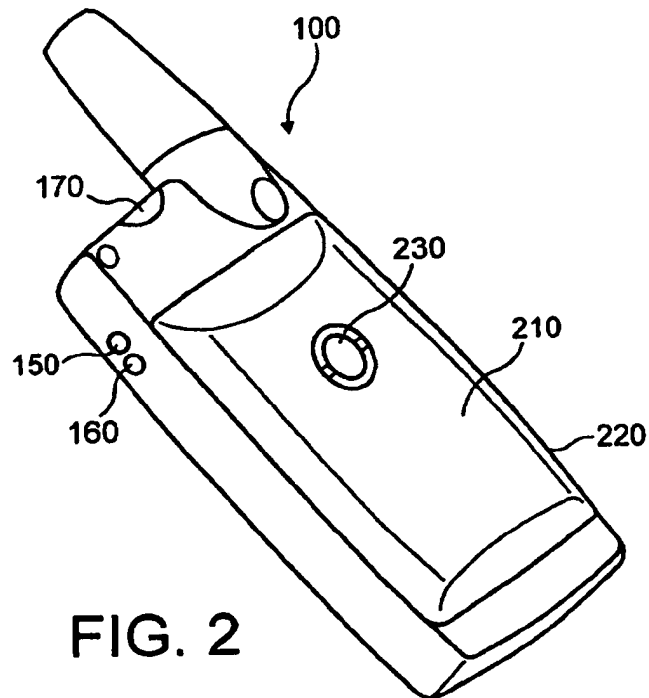


FIG. 2

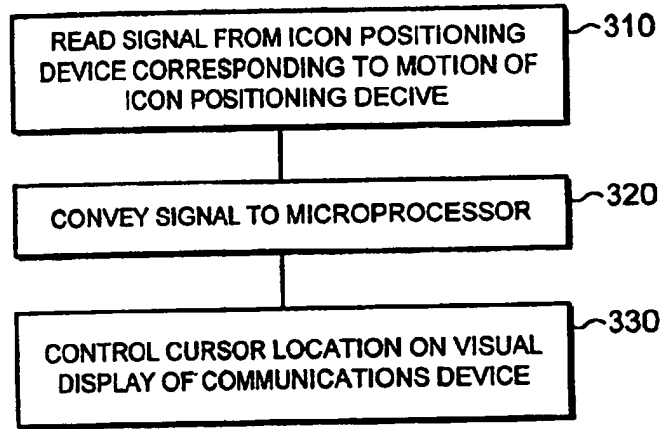


FIG. 3

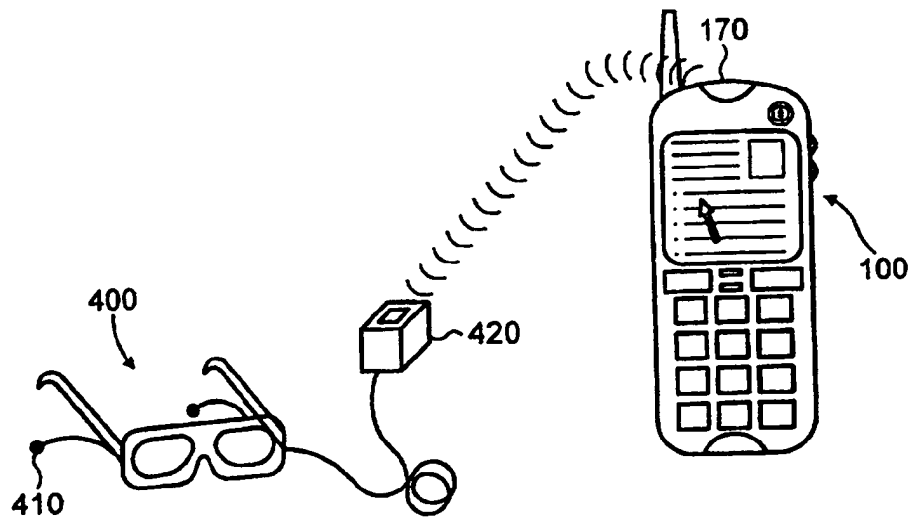


FIG. 4

COMMUNICATIONS DEVICETechnical field of the invention

5           This invention relates to a communications device,  
and particularly, although not exclusively, relates to  
personal digital assistants (PDAs), radiotelephones and  
the like, in particular to a wireless internet access  
device. More specifically, the invention relates to a  
10       radiotelephone comprising an icon positioning device  
for controlling a cursor on a built-in display, and a  
method for positioning a cursor on a built-in display  
of a communications device.

15       Description of related art

          Palmtop and laptop personal computers with  
wireless communications are known which have a  
trackball or other mechanism for positioning a cursor  
on a display. WO99/31567 discloses an electronic  
20       device having a keyboard and a retractable palmrest  
providing a mouse pad and mouse buttons.

          US-5943265 relates to a device able to function  
both as a wireless mouse and as a handset for a  
cordless telephone. The device allows the user to  
25       place telephone calls, receive telephone calls, and  
position the cursor on a personal computer screen, all  
from a remote location.

          In EP-A-0 712 068, a mouse having a numerical  
keypad, telephone circuit, speaker and microphone is  
30       proposed. The device is used to control the position  
of an icon on the display of a remote computer, the  
keypad further able to control communication over a  
telephone network through communication with a  
telephone network interface. In addition, the keypad  
35       may be used to enter information into the computer,

either through a conductor or using infrared signals.

Summary of the invention

5 It is an object of the present invention to  
provide an integrated, convenient icon positioning  
device in a portable communications device such as a  
radiotelephone or personal digital assistant (PDA).  
Such a device is particularly advantageous for mobile  
Internet use, for example, in conjunction with wireless  
10 application protocol (WAP) micro-browser software.

It is a further object of the present invention to  
provide an icon positioning device which economises on  
space and that is easily detachable from the  
communications device when not required.

15 According to one aspect of the present invention,  
the icon positioning device is provided on the  
underside of a communications device and is used to  
control the position of a cursor on the display of the  
communications device itself. The icon positioning  
20 device may be a mouse, having a trackball and  
mechanical transducer, an optical mouse, or other means  
responsive to movement of the communications device.  
Thus, it is unnecessary to provide a separate mouse or  
other icon positioning device with its associated  
25 connectors.

Preferably, the icon positioning device is built  
into the battery of the communications device and the  
battery is detachable from said communications device.  
Since the communications device may also function with  
30 a battery without icon positioning device as an  
alternative to a battery with icon positioning device,  
this has the advantage that a standard battery can be  
used when voice communications only are required.  
Preferably, the communications device is a  
35 radiotelephone. More preferably, a first key or switch

on said radiotelephone used to control said  
radiotelephone may also be used to control operation of  
said icon positioning device. Preferably, a second key  
or switch on said radiotelephone used to control said  
5 radiotelephone may also be used to control operation of  
said icon positioning device. To toggle between phone  
operation and control of the icon positioning device, a  
further button may be provided, or the feature may be  
accessible through a menu on the phone.

10 According to a second aspect of the invention, a  
separate display may be interfaced with a  
communications device, and an icon positioning device  
on the underside of the communications device can be  
used to control the position of a cursor on the  
15 separate display, under the control of an appropriately  
programmed processor within the communications device.  
Preferably, a low power infra-red or radio link to the  
separate display is used, for example, a Bluetooth  
link, as is known to those skilled in the art,  
20 providing a wireless connection. The separate display  
may be a pair of display glasses. Such an appliance  
has the advantage of providing a greatly enlarged, high  
resolution, virtual and portable display.

25 Thus, the system allows the user to have mobile  
access to the Internet.

#### Brief description of the drawings

For a better understanding of the present  
invention and to show how it may be carried into  
30 effect, reference will now be made, by way of example,  
to the accompanying drawings, in which:-

Figure 1 is a front view of a communications  
device having an icon positioning device in accordance  
with the invention.

35 Figure 2 is a perspective rear view of the

communications device shown in Figure 1.

Figure 3 illustrates operations for positioning a cursor in accordance with the invention.

Figure 4 illustrates an internet access system in  
5 accordance with the invention.

Detailed description of the preferred embodiments of  
the invention

10 Figures 1 and 2 show a radiotelephone 100 used for voice communications and for accessing on-line services such as Internet content with suitable browser software. It is to be understood that the invention is equally applicable to other communications devices such as a personal digital assistant (PDA), that is a  
15 handheld computer for personal use having a display, pen or keyboard input and software for organization, contact management, database and equipped with suitable communications means.

20 Radiotelephone 100 has an upper first surface 110 having a display 120, keypad 140, including numeric keys 142 a "YES" key 144 and a "NO" key 146, as well as volume keys 150 and 160. The radiotelephone 100 also includes a low power radiotransmitter 170 for providing a wireless connection to remote devices.

25 When in use, display 120 has a cursor 130 which, as is conventional, indicates an insertion point for inputs. Radiotelephone 100 further has a second, underside surface 210, partially defined by a battery 220. Radiotelephone 100 has other elements such as an  
30 antenna, earpiece and microphone as are known to those skilled in the art.

The radiotelephone includes a processor, under the control of operating software. The operating software preferably includes internet browser software, allowing  
35 a user to access the internet, or similar.

Battery 220 further comprises a mouse having a trackball 230 and a mechanical or opto-mechanical transducer, the mouse acting as an icon positioning device. Signals are supplied from the mouse, through  
5 matching contacts on the mouse and on the underside of the radiotelephone, to the radiotelephone. These signals are used to control the position of a cursor on the display 120 of the radiotelephone.

To that extent, the mouse can be used to control the  
10 position of the cursor on the display in the same way as a conventional mouse controls the position of a cursor on a display of a separate device. A conventional mouse also includes mouse buttons, which are used to provide inputs to the device. In the  
15 present embodiment of this invention, the "YES" and "NO" keys 144, 146 can be used as mouse buttons in a similar way. Thus, for example, pressing the "YES" key can have the same effect as left-clicking on a conventional mouse, while pressing the "NO" key can  
20 have the same effect as right-clicking on a conventional mouse. Alternatively, the volume keys 150, 160 could be used as mouse buttons in a similar way. Thus, pressing the volume increase key can have the same effect as left-clicking on a conventional  
25 mouse, while pressing the volume decrease key can have the same effect as right-clicking on a conventional mouse, or vice versa.

Battery 220 is preferably a lithium ion battery. Since lithium ion batteries have a unitary structure,  
30 rather than being made up of separate individual cells, it is easier to accommodate the mouse within the battery. For example, a 10mm diameter trackball can be accommodated within a 9mm thick battery.

Advantageously, the battery can include software  
35 which manipulates the signals supplied to the



radiotelephone, for example by applying a form of encryption. Corresponding decryption or other appropriate software can then be provided in the telephone, such that the mouse function of the  
5 telephone will only work with batteries which have the appropriate software.

Steps illustrating a method for controlling a cursor on a built-in display are shown in Figure 3. In use, rotation of trackball 230 produces a corresponding  
10 signal through opto-mechanical means which are well known to those skilled in the art. For instance, rotation of trackball 230 rotates perpendicular rollers attached to a slotted wheel which make and break an infrared beam. The signal is conveyed to a  
15 microprocessor and used to control the position of cursor 130 on the visual display 120 of the radiotelephone 100.

It is to be understood that the invention is equally applicable to other icon positioning devices  
20 such as an optical mouse, that is a handheld icon positioning device using purely optical technology to detect motion of the device. For example, the mouse may have a light emitting diode arrangement and an optical sensor to detect motion in place of a  
25 trackball, or it may have a complementary metal oxide semiconductor (CMOS) digital camera to image the surface beneath the mouse and a digital signal processor to analyse the images and translate movement of the mouse into movement of the cursor on the screen.

Turning now to Figure 4, there is shown a system  
30 for mobile internet access, including head-mounted display glasses 400 interfaced with the radiotelephone 100. As mentioned above, the radiotelephone operating software includes internet browser software, allowing a  
35 user to access the internet, or similar software for

accessing a similar computer network. As will also be apparent to the person skilled in the art, the radiotelephone must have sufficient processing power and available memory for internet access.

5           The display glasses may be of a type which is known in itself, for example Glasstron® glasses available from Sony Electronics Inc.

Display glasses 400 may also have earpieces 410 for supplying audio signals to a user.

10           Thus the separate display provides a greatly enlarged, high resolution, virtual and portable display, as is known to those skilled in the art. The display glasses 400 have a low power radio receiver 420, providing a wirefree connection with

15           radiotelephone 100 by means of the radio transmitter 170 on the radiotelephone. Preferably, a low power (1 milliwatt) Bluetooth™ radio link is used, as is known to those skilled in the art. It will be appreciated that an infra-red or other connection can be used.

20           Thus, use of the mouse or other icon positioning device can be used to control the position of a cursor on the virtual display provided by the glasses 400.

In addition, or as a further alternative to display glasses 400, the radiotelephone can be provided

25           with a projection-type display, which allows an image to be projected onto a suitable surface, or with a microdisplay, which allows a high resolution display to be created within the radiotelephone itself. A further possibility is that the radiotelephone can be provided

30           with a Bluetooth™ connection which can transmit display signals to a TV monitor. In any of these cases, the mouse or other icon positioning device can be used to control the position of a cursor on the display image.

35           When a further display function is provided,

separate from the display 120 of the radiotelephone itself, the display 120 of the radiotelephone can be a relatively low-resolution display, used in a conventional way to provide information about the status of a call, while the separate display (e.g. display glasses 400) can be used as a high-resolution display for the web browser. In that case, the mouse or icon positioning device may be used to control the cursor position only on the separate display, and not on the display 120. In this way, it is possible to use the radiotelephone to access the internet and make a separate voice call at the same time. For example, two users could each access a particular internet page for viewing on their respective high-resolution displays, while discussing it with each other using their radiotelephones.

As used herein, the term low-resolution is used to describe a display which is comparable to that conventionally found on a mobile phone, for example an LCD display 40mm x 25mm, while the term high-resolution is used to describe a display which is comparable to that conventionally found on a PC or laptop computer.

For example, the system of Figure 4 can be used to access the internet to download, for example a game, and can then be used to play the game using the display glasses 400.

There is thus described a communications device, and a communications network access system, which allow the provision of a good quality display, and a means for controlling a cursor thereon.

It is to be understood that the above detailed description of preferred embodiments of the invention is provided by way of example only. Various details of design and construction may be modified without departing from the true scope of the invention as set

forth in the appended claims.

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CLAIMS

1. A communications device having a display on a first face and an icon positioning device on a second face generally opposite said first face, the icon positioning device being usable to control the position of a cursor on said display.
2. A communications device as claimed in claim 1, wherein said icon positioning device is a mouse comprising a trackball and mechanical transducer.
3. A communications device as claimed in claim 1, wherein said icon positioning device is an optical mouse responsive to movement of the communications device.
4. A communications device as claimed in claims 1, 2 or 3, wherein said icon positioning device is built into a battery of the communications device and said battery is detachably connectable to said second face of said communications device.
5. A communications device as claimed in claim 4, wherein the battery comprises means for encoding cursor position control signals, and the communications device comprises means for decoding encoded cursor position control signals.
6. A communications device as claimed in any preceding claim, wherein said communications device is a radiotelephone or personal digital assistant.
7. A communications device as claimed in claim 1, in

the form of a radiotelephone, wherein a first key on said radiotelephone may be used to control operation of said icon positioning device.

- 5      8.    A communications device as claimed in claim 7,  
         wherein a second key on said radiotelephone may be  
         used to control operation of said icon positioning  
         device.
- 10     9.    A communications device as claimed in claim 8,  
         wherein the first and second keys are "YES" and  
         "NO" keys.
- 15     10.   A communications device as claimed in claim 8,  
         wherein the first and second keys are volume keys.
- 20     11.   A communications device as claimed in any  
         preceding claim, comprising a separate display  
         system for connection to the communications  
         device, wherein the icon positioning device is  
         usable to control the position of a cursor on said  
         separate display.
- 25     12.   A communications device as claimed in claim 11,  
         wherein the separate display system comprises  
         display glasses, having a wireless connection to  
         the communications device.
- 30     13.   A communications device as claimed in claim 12,  
         wherein the wireless connection is a Bluetooth™  
         connection.
- 35     14.   A communications device as claimed in claim 11,  
         wherein the separate display system comprises a TV  
         monitor.

15. A communications device as claimed in one of  
claims 1 to 10, comprising an integral  
microdisplay, wherein the icon positioning device  
5 is usable to control the position of a cursor on  
an image produced by said microdisplay.
16. A communications device as claimed in one of  
claims 1 to 10, comprising an integral projection  
10 display, wherein the icon positioning device is  
usable to control the position of a cursor on an  
image produced by said projection display.
17. A battery, having means for connection to a  
15 communications device to provide power thereto,  
and further comprising an icon positioning device.
18. A battery as claimed in claim 17, further  
comprising means for providing control signals  
20 from the icon positioning device to the  
communications device.
19. A battery as claimed in claim 17, wherein said  
icon positioning device is a mouse comprising a  
25 trackball and mechanical transducer.
20. A battery as claimed in claim 17, wherein said  
icon positioning device is an optical mouse  
responsive to movement of the battery.  
30
21. A battery as claimed in claim 17, wherein said  
icon positioning device is provided on an external  
surface of said battery.
- 35 22. A battery as claimed in claim 17, wherein said

battery is a lithium ion battery.

5 23. A battery as claimed in claim 17, further comprising means for manipulating signals for transmission to the communications device.

10 24. A method of controlling a cursor on a display of a communications device, wherein said display is on a first surface of said communications device comprising the steps of:

15 (a) reading a signal from an icon positioning device provided on a second surface of the communications device opposite said first surface, said signal corresponding to movement of icon positioning device;

20 (b) conveying said signal to a microprocessor; and  
(c) using information from said signal to control a cursor on the visual display of the communications device.

25 25. A method of controlling a cursor on the display of a communications device as claimed in claim 24, wherein said icon positioning device is a mouse and said signal is provided through a mechanical transducer responsive to motion of the mouse trackball.

30 26. A method of controlling a cursor on the display of a communications device as claimed in claim 24, wherein said icon positioning device is an optical mouse responsive to movement of the communications device.

35 27. A method as claimed in claim 24, wherein said icon



positioning device is provided in a battery attached to said communications device.

5 28. A method as claimed in claim 24, wherein said communications device is a radiotelephone or personal digital assistant (PDA).

29. A radiotelephone, comprising:  
a first display, for providing information about  
10 the status of a telephone call;  
software controlled means for accessing a computer network;  
connection means for a battery, to receive power  
and to receive cursor position control signals  
15 therefrom; and  
means for controlling a second display in  
accordance with information received from the computer  
network, and in accordance with received cursor  
position control signals.

20 30. A radiotelephone as claimed in claim 29, wherein the means for controlling a second display comprises means for communicating with a head-mounted display.

25 31. A radiotelephone as claimed in claim 29, wherein the means for controlling a second display comprises means for wireless communication with display glasses.

30 32. A radiotelephone as claimed in claim 29, wherein the connection means for a battery comprises means for decoding received cursor position control signals.

35

33. An internet access system, comprising:

a radiotelephone, a battery, and a high-resolution display system separate from the radiotelephone,

the battery being connectable to an underside of the radiotelephone, and having a mouse on its underside, and having means for sending cursor position control signals to the radiotelephone when connected thereto;

the radiotelephone comprising:

connection means for the battery, to receive power and to receive cursor position control signals therefrom;

software controlled means for accessing the internet;

means for displaying information received from the internet on the display system; and

means for displaying a cursor on the display system in accordance with received cursor position control signals.

34. A system as claimed in claim 33, wherein the display system comprises display glasses, having a wireless connection to and from the radiotelephone.



INVESTOR IN PEOPLE

Application No: GB 0002755.7  
Claims searched: 1 - 16 & 24 - 28

Examiner: Guy Tucker  
Date of search: 6 June 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4J (JK)

Int Cl (Ed.7): H01M2/00, 2/06, 2/10; H04M1/02, 1/03, 1/247, 1/274, 1/725

Other: Online JAPIO, WPI, EPODOC

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2339505 A (NEC) see whole document	1, 6, 15, 16, 24 & 28
X	GB 2330982 A (NOKIA) see in particular the abstract, figures 3 & 11 and page 6 lines 8 - 19	1 - 10, 15, 16 & 24 - 28
X	EP 0962852 A2 (NOKIA) see in particular the abstract, figures 1 & 2, col 6 line 17 - col 7 line 3 and col 8 line 9 - col 9 line 7	1 - 3, 6 - 10, 15, 16, 24 - 26 & 28
X	WO 98/06176 A1 (MOTOROLA) see whole document	1, 15, 16 & 24

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
B Patent document published on or after, but with priority date earlier than, the filing date of this application.



INVESTOR IN PEOPLE

Application No: GB 0002755.7  
Claims searched: 17 - 23

17

Examiner: Guy Tucker  
Date of search: 18 July 2000

## Patents Act 1977 Further Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4J (JK)

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Other: Online: EPODOC, JAPIO, WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	B	Patent document published on or after, but with priority date earlier than, the filing date of this application.